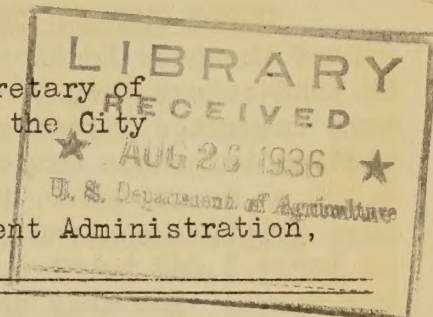


THE IMPACT OF TECHNOLOGY

Adapted from Remarks by Henry A. Wallace, Secretary of Agriculture, at the Centennial Celebration of the City of Council Bluffs, Iowa, August 11, 1936.

U. S. Department of Agriculture, Agricultural Adjustment Administration,
Washington, D. C.



H I G H L I G H T S

AGRICULTURE HAS KEPT PACE WITH INDUSTRY to an astonishing degree.

Between 1910 and 1930, output per worker increased 39 percent in manufacturing and 41 percent in agriculture. In the five years between 1922 and 1926, one of the most remarkable periods in agricultural history, agricultural production increased 27 percent, while crop acreage remained stationary and the amount of labor in agriculture decreased.

THE IMPACT OF TECHNOLOGY, IF UNCONTROLLED, would in time probably concentrate commercial agriculture in large mechanized units, financed by capital from the cities. The independent family-sized farm would have the severest sort of competition, perhaps fatal competition. It might have no choice but to withdraw from commercial agriculture and become relatively self-sufficient - as the lower income half of our farms now are.

MORE OF THE GAINS OF AGRICULTURAL TECHNOLOGY have accrued to industry and to the consumer than to the farmer. Within agriculture, except in times of severe depression, more of the gains have accrued to the larger and wealthier commercial farmer than to the man with a relatively small farm on relatively poor land. As a rule the wealthier farmers are in a better position to utilize the most up-to-date information from the agricultural colleges and the Department of Agriculture. As agricultural science progresses, the opportunities for the profitable employment of capital in agriculture increase. The result is to favor the land owner as against the tenant, the man with capital as against the man without capital.

IF THE CORN BELT WERE BEING RUN BY A GREAT CORPORATION, within 20 years it probably would be producing the present supply of pork and lard with half as much man-labor as at present, with 35 million instead of the present 50 million acres in corn, and with probably half as many farms and half as many people living on farms. That is the possibility of efficiency and commercialization pressed to the extreme.

THE TREND AWAY FROM THE FAMILY-SIZED FARM, owned by the man who operates it, has gone far enough to demand attention and action. Tenancy has steadily increased in the most favored farming areas, with Iowa well up in the list, followed closely by Nebraska, South Dakota, Illinois, and Kansas. In these States between 40 and 50 percent of the farms are occupied by tenants. In Iowa 10 percent of the land is owned by corporations. In Montana 14 percent of the land is so owned, and of the 42 percent owned by private individuals, a fourth is owned by people living outside the State.

UNDER THE OLD TRIPLE-A PROGRAMS, we had an opportunity to see to what extent absentee landlordism and multiple-ownership had developed. We discovered 55 land-owners each of whom owned 150 or more farms. Most of these big owners were insurance companies or banks, as you would expect. The largest owner, an eastern insurance company, owns more than 4,300 farms. How many more than 4,300 we do not know, for we have record only of those farms on which there were Triple-A contracts. In all, these 55 multiple-farm owners in 1934 operated at least 1,045 tobacco farms, nearly 11,000 cotton farms, and about 40,000 corn-hog farms. How many dairy, truck, or general farms they also operate, we have no way of knowing.

THE NEXT STEP WILL BE TO SEE WHAT CAN BE DONE to adapt our science and our machinery to the kind of agriculture we wish to see. If we are really serious about wishing to preserve the independent family-sized farm and to make it a profitable economic unit, we will begin considering more of our machinery needs from that viewpoint rather than from the viewpoint of the large-scale corporation farm. And perhaps we will consider more closely the enormous potentialities of electricity on the farm. With only one farm in ten having electric power, we still have ample room for progress here.

THE ADDRESS

On occasions such as this we naturally contrast the present with the past. In putting 1936 alongside 1836, some people think the advantage would lie with 1836, though they do not scorn the material comforts of 1936. Others, while rejoicing in our material progress since 1836, refuse to admit that our social and economic problems have changed since then, or can possibly require solutions that were not known and approved in 1836. Their loyalty to the 19th Century is so complete that I fear they are in for some very uncomfortable moments in the remainder of the 20th Century.

The source of their discomfort will be found in that one group of forces which more than any other is responsible for the way in which 1936 differs from 1836. I mean the forces of technology, of science and the machine. They have been changing our environment and our social and economic problems at an increasing rate of speed; there is every reason to expect the change to continue at still higher rates of speed. If our social and economic machinery had changed at equivalent rates of speed during the past century, our social and economic problems would be less acute today. But because the attitudes and prejudices of the 19th Century still dominate the minds of many, we still have to chase a 20th Century airplane in a 19th Century horse and buggy.

The forces of technology have been particularly active in agriculture. The difficulty is that they seem to have created at least as many problems as they have solved. That is why we have to concern ourselves with the impact of technology on agriculture.

FORCES OF TECHNOLOGY ARE IMPERSONAL

If you believe that concentration of land ownership is a threat to our most cherished American traditions; if you are concerned about the extent of tenancy and absentee landlordism in our best farming regions; or if the intensive commercialization of American agriculture seems to you at best a mixed blessing, you must of necessity look critically at the compulsion behind these trends. Much of that compulsion comes from the impersonal forces of technology -- new inventions, new machines, new crop varieties, new productive and distributive processes.

To a large extent the kind of agriculture we wish to have in the United States of tomorrow depends upon the forces of technology, and how we propose to let them operate. It is not merely a question of how much corn, wheat, and cotton we can produce or ought to produce, or a question of where these great staples can most profitably be produced; it is even more a question of how to preserve and enlarge the economic opportunities of the great mass of farmers.

The droughts of 1930, 1934, and of 1936 have concealed the operation of these technological forces, but certainly have not stopped them. It is safe to assume that they will be in full swing during the next five or ten years, as they were in the decades of the Twenties. Once again they may bring us burdensome surpluses, strange as that thought seems today in the wake of the worst drought in our history; and again they will shove us closer and closer to the day when we must either control them or be controlled by them.

Ask the average city person about the contributions of science and the machine during the past century and he will at once mention the radio and the airplane, the automobile and the telephone, perhaps mass production in industry. He will usually be unaware of the impact of technology upon agriculture, though his very existence in the city has depended upon it.

The fact is that agriculture has kept pace with industry to an astonishing degree. Between 1910 and 1930, output per worker increased 39 percent in manufacturing and 41 percent in agriculture. In the five years between 1922 and 1926, one of the most remarkable periods in agricultural history, agricultural production increased 27 percent, while crop acreage remained stationary and the amount of labor in agriculture actually decreased.

EFFICIENCY RELEASES LAND, DISPLACES FARMERS

For a long-range contrast, put 1936 against 1787, the year the Constitution was framed. Then it took 19 persons living on farms to produce enough for themselves and for one person in town. Today 19 persons on farms can produce enough for themselves and for 66 living in town.

This is a shift of greater magnitude than took place in the 10,000 years previous to 1787. We are not yet fully aware of its meaning. Our minds and bodies, traditions and customs have been shaped by thousands of years of the most difficult hand-to-hand conflict with the forces of nature. It is a heart-breaking job to plow an acre of wheat with primitive tools. It is a back-breaking job to harvest the wheat of that acre, and it is a long and disagreeable

job to flail out a bushel of wheat from the straw. Each grain of wheat represented a drop of sweat. The man who produced it had come into the most intimate physical contact with the soil. In 1787 nine out of ten people in the United States knew exactly what it meant to sweat in the fields and to watch for the rain which was long in coming. Even the people in town were close to the fields. Most of them had their gardens; nearly all of them kept a cow and a pig or two. With few roads and uncertain transportation, agriculture was in truth a local matter.

During the first 100 years of our national existence, agriculture dominated our national life. Our most dramatic activity was occupying new lands. The great contribution of finance and industry was to build the roads, the railroads, and the machinery necessary to enable farmers to occupy new lands. As a result of these forces of change, the efficiency of the average farmer during our first 100 years increased probably more than five-fold. During the past 50 years his efficiency has about doubled. And it is possible again to double the efficiency of the average farmer in the United States, probably in much less than 50 years, but this cannot take place as long as we have urban unemployment of such a nature as to force unemployed persons unfamiliar with farming back on the land.

MAN AIDED BY SCIENCE AND MACHINE

In a thousand ways science and the machine conspire to help us produce more per hour of man-labor. A crop rotation which enriches the soil means more corn per acre; a new corn variety which outyields existing ones by 5 or 10 bushels, or which cuts down losses from disease, insects, or bad weather; a machine which plows, cultivates, or harvests more efficiently; a size of field and of farm which is best adapted to the new machines and practices -- things of this sort can easily add up to smaller land and labor requirements, probably larger but fewer farms, greater demand for outside capital, perhaps more absentee landlordism, more tenancy, and more production for market.

Efficiencies of this sort made it possible between the end of the World War and the beginning of the depression to increase milk production 35 to 40 percent with only a 15 percent increase in dairy cow numbers; and increase pork and lard production 18 percent with 9 percent fewer hogs.

We can do still better. In the not too distant future I believe we can have a strain of hogs whose inheritance can be so controlled that their offspring will average a hundred pounds of gain from 330 pounds of feed instead of the present 400.

If the Corn Belt were being run by a great corporation, say the AT&T, within 30 years it probably would be producing the present supply of pork and lard with half as much man-labor as at present, with 35 million instead of the present 50 million acres in corn, and with probably half as many farms and half as many people living on farms. That is the possibility of efficiency and commercialization pressed to the extreme. May the day of impersonal corporate dominance of a completely efficient and commercialized agriculture never come!

Yes, the gains of science and the machine are obvious. But there is a question as to the distribution of these gains, and there is another question as to the social cost of technological progress.

WORKERS' LIVING STANDARDS HIGHER

Both in agriculture and in industry some of the gain in efficiency has of course accrued to the worker in the form of higher living standards. In England in the Middle Ages it took the value of several days of city labor to buy a bushel of wheat. By 1840 in the United States, it required six hours of city labor on the average to buy a bushel of wheat, but by 1930 the ratio had been reduced to 1.3 hours. In this country during the past 100 years the increase in efficiency of both farm and city labor has been astounding. Now it's time to begin thinking about a just distribution of those gains.

More of the gains of agricultural technology have accrued to industry and to the consumer than to the farmer. Within agriculture, except in times of severe depression, more of the gains have accrued to the larger and wealthier commercial farmer than to the man with a relatively small farm on relatively poor land. As a rule the wealthier farmers are in a better position to utilize the most up-to-date information from the agricultural colleges and the Department of Agriculture. As agricultural science progresses, the opportunities for the profitable employment of capital in agriculture increase. The result is to favor the land owner as against the tenant, the man with capital as against the man without capital.

But now a new tendency is operating. Now we see the impact of science and the machine favoring the application of the corporate form of organization to those areas where the wealthier commercial farmers have hitherto been supreme.

The impact of technology, if uncontrolled, would in time probably concentrate commercial agriculture in large mechanized units, financed by capital from the cities. The independent family-sized farm would have the severest sort of competition, perhaps fatal competition. It might have no choice but to withdraw from commercial agriculture and become relatively self-sufficient - as the lower income half of our farms now are.

TECHNOLOGY MAY CREATE PEASANT CLASS

Thus the same technology which can give us such highly efficient commercial farms, can at the same time give us a peasantry. As I understand it, a peasant is essentially one who works long hours on his own land more or less inefficiently, producing most of what he consumes, selling little and buying little. Under peasantry the farmer might sell 10 percent of what he produces and buy 10 percent of what he consumes; at the other end of the agricultural scale, the highly commercialized, mechanized end, the man or the corporation owning the land might sell 95 percent of what they produced and buy from others 95 percent of what they consumed.

The trend away from the family-sized farm, owned by the man who operates it, has gone far enough to demand attention and action. Tenancy has steadily increased in the most favored farming areas, with Iowa well up in the list, followed closely by Nebraska, South Dakota, Illinois, and Kansas. In these States between 40 and 50 percent of the farms are occupied by tenants. In Iowa 10 percent of the land is owned by corporations. In Montana 14 percent of the land is so owned, and of the 42 percent owned by private individuals, a fourth is owned by people living outside the state.

Under the old Triple-A programs, we had an opportunity to see to what extent absentee landlordism and multiple ownership had developed. We discovered 55 land-owners each of whom owned 150 or more farms. Most of these big owners were insurance companies or banks, as you would expect. The largest owner, an eastern insurance company, owns more than 4,300 farms. How many more than 4,300 we do not know, for we have record only of those farms on which there were Triple-A contracts.

In all, these 55 multiple-farm owners in 1934 operated at least 1,045 tobacco farms, nearly 11,000 cotton farms, and about 40,000 cornhog farms. How many dairy, truck, or general farms they also operate, we have no way of knowing.

Much of the transfer of farm ownership to corporations during the depression was due to high debts and low prices. When, as in 1932, prices for some farm products were lower than they had been since the time of Queen Elizabeth, farmers whose farms were mortgaged were unable to avoid foreclosure. Similarly, those farmers who had been the victims of drought, flood, or other natural disaster have found it difficult or impossible to hold on to their property.

We do not know what will be the full or final effects of the present drought. But we do know that government intervention has helped and is now helping to protect farmers in the drought-stricken areas from its full effects. Without this help the family-sized farm is bound to lose further ground.

CORPORATIONS, IN ADVANTAGEOUS POSITION

A corporation farm cannot withdraw into self-sufficiency. It must use every new machine, every scientific advance that promises to lower production costs and increase its return on its property. Investing a thousand dollars or more in a new machine may be out of the question for many individual farmers, but a corporation with thousands of acres to operate has both the economic incentive and the capital to buy the machine. Concentrated, large-scale ownership of farm land inevitably means the prompt and full application of science and the machine to agriculture. That in turn means lower production costs, probably increased production, and even stiffer competition for the family-sized farm in what is already the most competitive of industries.

The average farmer might dismiss this increased competition as an idle threat if he could see ahead of him a constantly enlarging market for his products. But with a stationary population possible 10 or 15 years hence, and with the demand for food largely fixed by the size of the human stomach, the average farmer cannot look forward to endless expansion of his market. He sees the gains possible through science and the machine, but he also counts losses. He wants to increase his efficiency, but he doesn't want to see the family-sized farm shoved off the map as a result.

Our dilemma therefore, seems to be as follows: Shall American agriculture let an uncontrolled technology wipe out the independent family-sized farm, or shall American agriculture turn its back on technology, in order to preserve the family-sized farm?

Most people will shrink from either horn of the dilemma. Most of us want both the family-sized farm and all the blessings of science and the machine. Most of us, therefore, will seek a middle course. There are some, though, who would sabotage science and the machine as the wisest move.

A month or so ago I was talking about this with Chester Davis, then just returned from Europe. Mr. Davis told me that in Hungary he had found an excellent illustration of this very thing. For some years now many Hungarian farmers have been landless, or with inadequate acreages. As a result they have had to have extra work in order to live. The coming of large-scale farm machinery, however, threatened their livelihood. The government, fearing agrarian discontent and political trouble, adopted the definite policy of discouraging the use of binders and mowers in harvesting grain. The policy is rather easily enforced, since the Hungarian Government operates a grain monopoly, and refuses to buy the grain of those farmers who use the forbidden machinery. In consequence, visitors to Hungary in the year 1936 will find farmers still harvesting their grain with scythe and cradle.

INDUSTRIAL LABOR FORCED INTO FACTORIES

That is one way to avoid the impact of technology. It is much like the way in which English labor tried to meet the impact of technology on the textile industry more than a century ago. New machines, product of the industrial revolution, promised to destroy cottage industry, where a man's home was also his workshop. The machines required factories, but the labor of that day resented being herded into a factory. That was regimentation. And labor also feared for its bargaining power under the factory system, and for economic independence and security. So the breaking of machines and the burning of factories were labor's first answer to the industrial revolution. The industrial revolution, however, went on.

It is possible that American agriculture, as represented by the family-sized farm, is today in somewhat the same state that cottage industry was in England more than a century ago. It is possible that those American farmers without capital and without training to use the results of modern science may become even more bitter than the British handicraft workers of a hundred years ago.

The handicraft workers of a hundred years ago were crushed because they did not understand the nature of the forces they were combatting. The disadvantaged farmers of the United States today may face the same fate if they fail to understand the true cause of their trouble, and instead permit themselves to be misled by political propaganda about tariffs, or rugged individualism, or bureaucracy, or spending, or any of the other phrases designed to conceal thought and catch votes.

When superior efficiency is made available for the benefit of all mankind, it is surely wiser to direct such efficiency than to attempt to stop it. But the problem is to make superior efficiency the servant of the general welfare and not merely the weapon of a favored group. It is unfortunate that so many human beings should feel bitter toward one another when the source of much of the difficulty is the superior competing power of those who have the capital to use the results of science and invention. The tension created by the uneven and

to some extent accidental impact of this situation upon different groups causes millions of people, through no apparent fault of their own, to buck up against problems which as individuals they cannot possibly solve. The consequences -- economic distress and social unrest -- affect all society. If the social organism is to survive it is obvious that tensions of this sort must be relieved by social mechanisms which operate more definitely on behalf of the general welfare.

It is conceivable that American agriculture might go through the same painful evolution that English cottage industry went through a century ago, but it does not seem to me necessary. Concentration of land ownership, tenancy and all the other undesirable consequences of technology of course can continue undisturbed, but only if we the people are content to have it that way.

FORCES OF TECHNOLOGY MAY BE GUIDED

We can't stop the forces of technology, but we can take steps to guide them into more socially desirable channels. Perhaps the first step will be a universal appreciation that these forces are too powerful to be stopped by speeches, by resolutions, or even by legal decisions. In this country, as in England a century ago, the impact of technology will be stopped by none of these things -- not even by State lines.

The next step will be to see what can be done to adapt our science and our machinery to the kind of agriculture we wish to see. If we are really serious about wishing to preserve the independent family-sized farm and to make it a profitable economic unit, we will begin considering more of our machinery needs from that viewpoint rather than from the viewpoint of the large-scale corporation farm. And perhaps we will consider more closely the enormous potentialities of electricity on the farm, a field in which the Rural Electrification Administration has been doing some excellent pioneer work. With only one farm in ten having electric power, we still have ample room for progress here.

But perhaps most important of all, there is that basic question of our attitude toward government. Is individual initiative the only weapon necessary against the impact of technology on agriculture, or should farmers have the right, within limitations, to borrow the powers of government?

If we look at the matter in a common-sense way, forces which operate on a nationwide and worldwide scale, whether they are the result of the inventions of man, or of the failure of nations to adjust themselves to the facts of the post-war situation, or of unusual developments in nature -- such forces are the proper concern of all National Governments worthy of the name.

This afternoon I have talked chiefly about the first force, the impact of technology on agriculture, and have suggested that while future expansion of agricultural technology and invention was desirable and probably inevitable yet grave social problems were certain to be caused by the unequal impact of technology on different classes of our society.

Concerning the second of these forces, having to do especially with the failure of the United States to adjust herself to her post-war creditor position,

I have written in the pamphlet "America Must Choose" and elsewhere. With regard to the third force, that which has to do with unusual developments of nature, there is no great difference of opinion.

SCIENTIFIC STUDY OF FARM PROBLEMS ADVISED

Everyone, I think, will agree that this drought, like those of 1934 and 1930, is interstate. The legalistic mind may think agriculture a local matter, but the weather doesn't, and neither can a responsible National Government.

No one can contemplate the plight of people in the dust bowl or the Northwest striving year after year against impossible weather without resolving that some constructive solution must be found. The government has poured millions of dollars into these regions in recent years for purposes of temporary relief. Millions of acres in these regions are under the plow and in years when rainfall is plentiful the crops are worth more than the land.

But should the Federal Government maintain thousands of people in such areas until it rains again? Or should the Government devise an actuarially sound insurance scheme for staple crops in such regions? Or should the Government zone the land as the State of Wisconsin has done and then gradually enable the people to shift while at the same time new people are not allowed to come in to plow land which never should be plowed?

There are many possible answers and no one of them is altogether sound for all regions. But the one thing we do know is that we need more fundamental scientific study and less alarmist talk. We need a continual study over the entire world of long-time trends in weather. We need to know more definitely the regions which should be left to grass and trees and which should never be plowed. We need to know the regions where the land can be plowed with safety but where special methods should be used and crop insurance schemes set up.

America's vast natural resources, her technological and inventive ingenuity, and her democratic institutions make her the hope of the world's future. Opportunities are spread before us which are available to no other people. On the one hand we can waste our soil and other natural resources, we can use our inventive power chiefly to create unemployment and we can prostitute our democratic institutions through hireling, destructive propagandist agencies. On the other hand we can conserve our soil and our natural resources, we can use our inventive power to increase jobs and the standard of living of all our people and we can make our democratic institutions truly virile with an understanding so well informed that hireling propagandists will spend their money in vain. America is sound at heart and wishes to devote her inventive power, her natural resources, and her democratic institutions to give bounty and hope to all our people insofar as their ability permits.

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